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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--------------------------------------|-------------|----------------------|--------------------------|------------------|
| 10/643,975 | 08/20/2003 | Hiroyuki Minemura | 1021.43050X00 | 4972 |
| 20457 | 7590 | 09/15/2006 | EXAMINER | |
| ANTONELLI, TERRY, STOUT & KRAUS, LLP | | | DANIELSEN, NATHAN ANDREW | |
| 1300 NORTH SEVENTEENTH STREET | | | ART UNIT | PAPER NUMBER |
| SUITE 1800 | | | | 2627 |
| ARLINGTON, VA 22209-3873 | | | | |

DATE MAILED: 09/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/643,975 | MINEMURA, HIROYUKI | |
| | Examiner | Art Unit | |
| | Nathan Danielsen | 2627 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 20 August 2003.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-10 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-8 is/are rejected.
 7) Claim(s) 9 and 10 is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 20 August 2003 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
 5) Notice of Informal Patent Application
 6) Other: _____

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DETAILED ACTION

1. Claims 1-10 are pending.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

3. The drawings are objected to because "APPREXIMATION" in figure 4A should be --APPROXIMATION--. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 2, 6, 9, and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 2 is rejected as being indefinite because it is unclear what exactly is meant by the phrase "larger enough". Additionally, claim 2 recites the limitation "said digital bit array" in the last paragraph. There is insufficient antecedent basis for this limitation in the claim. Claim 6 is rejected as being dependent on an indefinite claim.

8. Claim 9 recites the limitations "the result" and "said bit array". There is insufficient antecedent basis for these limitations in the claim. For purposes of examination, "the result" has been interpreted to mean "the compensation value". Claim 10 is rejected as being dependent on an indefinite claim.

Claim Rejections - 35 USC § 101

9. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-6 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. These claims are directed to methods of transforming a reproduced signal into a binary value, and are thus non-statutory. If the "acts" of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter (see Benson, 409 U.S. at 71-72, 175 USPQ at 676 and Schrader, 22 F.3d at 294-95, 30 USPQ2d at 1457-59). Thus, a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1, 3, 7, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Taguchi et al (US Patent 5,796,693; hereinafter Taguchi).

Regarding claim 1, Taguchi discloses an information reproducing method that employs a PRML method for comparing a target signal with each reproduced signal for a continuous N time to select the most likelihood one of state changes therein, thereby transforming said reproduced signal to a binary value; wherein, when said PRML method is represented as $PR(a_1, a_2, \dots, a_N)$, the leftmost M1 coefficient and the rightmost M2 coefficient in a coefficient array are all zero while integer values M1 and M2 satisfy a relationship of " $M_1 \geq 0, M_2 \geq 0, M_1 + M_2 \geq 1, M_1 + M_2 < N$ "; and wherein, when integer $MM = M_1 + M_2$ and integer $NN = N - MM$ are satisfied, said method includes:

a step of using a target value obtained by adding 2^N or less compensated values V_2

corresponding to a value of an N-bit digital bit array to an initial target level V_1 obtained by a convolution operation of each of NN non-zero coefficient values and an NN-bit digital bit array (col. 7, lines 35-55 and figure 5); and

a step of binarizing said reproduced signal to the most likelihood bit array while comparing said reproduced signal with said target value ($V_1 + V_2$) (col. 7, lines 35-55 and figure 5).

Regarding claim 3, Taguchi discloses where said method further includes a step of obtaining a compensated reproduced signal by calculating a compensation value V_2 for each group of N bits in said binarized bit array (col. 7, lines 35-55 and figure 5), then subtracting the result from said reproduced signal (col. 12, lines 3-12).

Regarding claim 7, Taguchi discloses an information reproducing drive for outputting a binary value obtained from a reproduced signal with use of a PRML method, said drive comprising:

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a PR target output unit for outputting a PR class target value corresponding to an N-bit bit array (expectation determiner 16 in figure 5);
a pattern compensation table for storing a compensation value corresponding to each M-bit ($M > N$) bit array (col. 7, lines 35-55 and figure 5);
a waveform equalizer for equalizing a reproduced signal (equalizer 4 in figure 4); and
a branch metric calculation unit for calculating a branch metric value for each bit array by employing a target value obtained by adding up a PR target value output from said PR target value output unit and a compensation value stored in said pattern compensation table with respect to an output from said waveform equalizer (maximum likelihood calculator 7 in figures 7 and 8).

Regarding claim 8, Taguchi discloses where said drive further includes a compensation table study unit for correcting said pattern compensation table so as to minimize an error between an output from said waveform equalizer and said target value calculated in accordance with an obtained binary bit array (data pattern recognition unit 15 in figure 5).

Citation of Relevant Prior Art

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
 - a. Miyashita et al (US Patent Application Publication 2002/0067677) disclose an equalizer and PRML detector comprising a coefficient learning circuit and an FIR filter, wherein the FIR filter further comprises an adder for adding and subtracting delayed signal components which have been multiplied by coefficients not restricted to positive numbers.

Allowable Subject Matter

13. Claims 9 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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14. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record, either alone or in combination, fail to teach or fairly suggest a DAC for converting the compensated digital signal into a compensated reproduced signal, as claimed in claim 9.

Closing Remarks/Comments

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Danielsen whose telephone number is (571) 272-4248. The examiner can normally be reached on Monday-Friday, 8:30 AM - 4:30 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, A.L. Wellington can be reached on (571) 272-4483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nathan Danielsen
09/11/2006

ND


ANDREA WELLINGTON
SUPERVISORY PATENT EXAMINER